

REMARKS

Claims 1-16 are pending. By this Amendment, claims 1 and 7 are amended, claim 12 is cancelled, and claims 17-22 are added, thereby preserving claims 2-6 and 8-16 in their originally-filed condition.

35 U.S.C. § 112, second paragraph, Rejections

Claims 1-14 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner indicated that independent claims 1 and 7 cite a spring biasing the disc face against the plate face and that it appears in the figures that the spring is biasing the plate face against the plate face. Also, the Examiner stated that claim 1 cites a brake plate mounted to be relatively stationary, the brake plate thereby rotating with respect to the brake disc and that it appears that the brake plate does not rotate, but translates on the shaft in the axial direction. In addition, the Examiner indicated that claim 7 cites a brake disc movable between an engaged position and a retracted position and the Examiner stated that the brake disc does engage the brake plate, but it is the brake plate that moves to engage the brake disc.

Applicant respectfully submits that independent claims 1 and 7 have been incorrectly interpreted by the Examiner with respect to the biasing of the plate face and the disc face by the spring. The Examiner has interpreted the language of the claims 1 and 7, particularly “a spring biasing the disc face against the plate face”, to indicate a particular direction of biasing or movement of the plate face and the disc face. When in fact, the particular language of claims 1 and 7 is not meant to indicate a direction of biasing or movement of the plate face and the disc face, but is meant to generally indicate that the plate face and the disc face are biased against each other by the spring without indicating any direction of biasing or movement. Claim limitations relating to direction of biasing are added in respective dependent claims.

For purposes of clarifying any confusion that the Examiner may have had with respect to the interpretation of claims 1 and 7, Applicant has amended claims 1 and 7 accordingly. Such amendments to claims 1 and 7 are not narrowing amendments.

Applicant has also amended claim 1 to cite “...the brake disc thereby rotating with respect to the brake plate...”. Applicant unintentionally switched the brake disc and the brake plate in the previous sentence upon the filing of the present application and is hereby amending

claim 1 to correct the unintentional error identified by the Examiner. This amendment to claim 1 is not a narrowing amendment.

Applicant also unintentionally switched the citation of the brake plate, and elements thereof, with the brake disc, and elements thereof, in claim 7 upon the filing of the present application. Applicant is hereby amending claim 7 to correct the unintentional error identified by the Examiner. This amendment to claim 7 is not a narrowing amendment.

In view of the current claim amendments to claims 1 and 7, the 35 U.S.C. §112, second paragraph, rejections have been overcome and are now moot.

35 U.S.C. § 103(a) Rejections

Claims 1-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,155,386 (“Hirai et al.”) in view of U.S. Patent No. 1,756,907 (“Payne”). Reconsideration of the rejections is respectfully requested.

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of presenting a *prima facie* case of obviousness based upon the prior art. In re Fritch, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992); In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). The test for obviousness is what the combined teachings of the prior art would have suggested to one of ordinary skill in the art. In re Keller, 642 F.2d 413, 425, 208 U.S.P.Q. 871, 881 (CCPA 1981).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. In re Vaeck, 947 F.2d 488, 493, 20 U.S.P.Q. 2d 1438, 1442 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. Id. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 985, 180 U.S.P.Q. 580, 583 (CCPA 1974); MPEP §§706.02(j), 2143.03.

Independent claim 1 recites (underlining added for emphasis):

A braking system for a shaft mounted for rotation, the braking system comprising:

 a brake disc coupled to the shaft for rotation therewith, the disc including a disc face having a plurality of disc plateaus positioned around the

circumference of the disc, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau;

a brake plate mounted to be relatively stationary, the brake disc being rotatable with respect to the brake plate, the brake plate including a plate face positioned substantially parallel and adjacent to the disc face and including a plurality of plate plateaus corresponding to the number of disc plateaus, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled relative to the plate face at approximately the same angle at which the disc ramps are angled relative to the disc face, the plate plateaus defining recesses between consecutive plate plateaus that are dimensioned to correspond to the disc plateaus such that the disc plateaus mate with the recesses; and

a spring, the disc face and the plate face being biased against each other by the spring.

Hirai et al. discloses an electromagnetic brake including a field 1, an armature 3, a rotating shaft 12, a brake plate 4 connected to the rotating shaft 12 and being rotatable therewith, a flat lining 5 attached to an end face of the brake plate 4 for engaging the armature 3, and three hemispherical elastic members 11 for suppressing striking noise generated by the armature 3 engaging the field 1. Engagement between the flat lining 5 and the armature 3 create friction necessary to brake the rotating shaft 12 and brake plate 4 from rotating relative to the field 1 and the armature 3.

Payne discloses a clutch including an electromagnet B having a plurality of torque producing areas B1 and B2, an armature disc plate D having a plurality of torque producing areas D1 and D2, and annular pressure rings E and F whose inner faces engage each other to reduce the pressure to the limit of good bearing practice in order to avoid over-heating and cutting while they slide upon each other during the period of pick up when the clutch is slipping and before it locks (page 2, column 1, lines 1-11). Along with the engagement between the rings E and F, areas B1 and B2 engage areas D1 and D2, respectively, on each others flat end portions (see Figs. 3-5) and do not mate with grooves W defined between the areas (also see page 2, column 1, lines 21-29). The clutch also includes shafts S and T. When the clutch is activated, engagement between the electromagnet B and the disc plate D and engagement between the rings E and F cause the shaft T to rotate with the shaft S. No breaking of either shaft is occurring, only the engagement and synchronization of one shaft with another.

There is no teaching or suggestion within Hirai et al. or Payne to combine the references as suggested by the Examiner and, in fact, the teachings of Hirai et al. and Payne actually teach

away from such a combination. As discussed above, Hirai et al. discloses an electromagnetic brake with a noise suppressing device and Payne discloses a clutch system. Braking systems and clutch systems operate in different matters to produce very different outcomes. In particular, braking systems operate to brake or prevent further movement of a device, while clutch systems operate to selectively cause two devices to work together (in Payne, the clutch system causes shaft T to rotate with shaft S). Due to the different operating matters and different outcomes, one of ordinary skill in the art of either braking systems or clutch systems would have no reason to review the other art. There is no suggestion or motivation, whether explicit or implicit, in Hirai et al. or Payne that the teachings of the references should or could be combined.

The references are devoid of any teaching or suggestion of the claimed braking system or the advantages that flow therefrom. The only motivation for the claimed braking system comes from Applicant's invention and, therefore, the Examiner's rejection is a classic case of hindsight.

In addition, the references actually teach away from making the combination proposed by the Examiner. Particularly, a braking system is operable to stop or prevent movement of an item. The braking system of Hirai et al. stops the brake plate 4 and the shaft 12 from rotating. Sufficient friction must be introduced to the brake plate 4 to stop it and the shaft 12 from rotating. The clutch disclosed in Payne does not stop or prevent movement of an item. In fact, it causes one of the shafts S or T to move from a stopped condition to a moving condition such that the one shaft S or T moves with the other shaft S or T. There is nothing within the clutch that stops or prevents movement of an item for braking purposes. Accordingly, a clutch system by nature teaches away from the very nature of a braking system and, therefore, implicitly and explicitly Payne and Hirai et al. teach away from making the proposed combination. It is improper to combine references where the references teach away from their combination. In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983); MPEP §2145(X)(D)(2).

For these and other reasons, there is no teaching or suggestion within Hirai et al. or Payne to combine the references as suggested by the Examiner.

Further, assuming arguendo that the teachings of Hirai et al. and Payne could or should be combined, Applicant respectfully points out that there is no reasonable expectation of success of such a combination. Each of the devices disclosed in Hirai et al. and Payne are designed specifically for the operation to be performed (i.e., braking and clutching). With regards to Hirai et al., utilizing design choices derived from a clutch would bring about operations relating to a clutch, not a braking system, and would therefore produce an inoperative, unsuccessful braking

system. Likewise in Payne, utilizing design choices derived from a braking system would bring about operations relating to a braking system, not a clutch, and would therefore produce an inoperative, unsuccessful clutch. More particularly, see the discussion in the previous paragraph with respect to the differences between braking systems and clutches and the undesirability of combining operations thereof. Accordingly, such a combination of Hirai et al. and Payne as proposed by the Examiner would have no reasonable expectation of success.

Also, assuming arguendo that the teachings of Hirai et al. could or should be combined, Applicant respectfully points out that, even with the modification suggested by the Examiner, the subject matter defined by independent claim 1 is not provided by the references.

As acknowledged by the Examiner (Office action dated 4/26/04, page 3, paragraph 4), Hirai et al. does not teach or suggest a disc face having a plurality of disc plateaus positioned around the circumference of the disc, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau and a plate face including a plurality of plate plateaus corresponding to the number of disc plateaus, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled relative to the plate face at approximately the same angle at which the disc ramps are angled relative to the disc face, the plate plateaus defining recesses between consecutive plate plateaus that are dimensioned to correspond to the disc plateaus such that the disc plateaus mate with the recesses. Rather, Hirai et al. discloses an electromagnetic brake including a field 1, an armature 3, a brake plate 4 having an end face and a flat lining 5 attached to the end face for engaging the armature 3, and three hemispherical elastic members 11 for suppressing striking noise generated by the armature 3 engaging the field 1.

Payne does not cure the deficiencies of Hirai et al. Payne also does not teach or suggest, among other things, a disc face having a plurality of disc plateaus positioned around the circumference of the disc, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau and a plate face including a plurality of plate plateaus corresponding to the number of disc plateaus, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled relative to the plate face at approximately the same angle at which the disc ramps are angled relative to the disc face, the plate plateaus defining recesses between consecutive plate plateaus that are dimensioned to correspond to the disc plateaus, and the plate plateaus defining recesses between consecutive plate plateaus that are dimensioned to correspond to the disc

plateaus such that the disc plateaus mate with the recesses (underlining added for emphasis).

Rather, Payne discloses a clutch including an electromagnet B having a plurality of torque producing areas B1 and B2, an armature disc plate D having a plurality of torque producing areas D1 and D2, and annular pressure rings E and F whose inner faces engage each other to reduce the pressure to the limit of good bearing practice in order to avoid over-heating and cutting while they slide upon each other during the period of pick up when the clutch is slipping and before it locks (page 2, column 1, lines 1-11).

The Examiner contends that it would have been obvious to one having ordinary skill in the art at the time of the invention to have provided the contacting disc and plate surfaces of Hirai et al. with the plurality of plateaus and recesses as taught by Payne in order to positively lock the plate to the disc in order to prevent further relative motion.

In fact, Payne teaches away from the Examiner's contention and away from the claimed subject matter of independent claim 1. In particular, the rings E and F make it possible to place the grooves and torque producing areas B1, B2, D1, D2 quite close together as shown in Figs. 3-5 without danger of interlocking or of too great of wear on the engaging faces of the areas B1, B2, D1, D2 (page 2, column 1, lines 21-29). Accordingly, torque producing areas B1 and B2 do not mate with grooves W formed between torque producing areas D1 and D2, nor do the torque producing areas D1 and D2 mate with the grooves W formed between torque producing areas B1 and B2. Contact between the torque producing areas B1 and B2 and the torque producing areas D1 and D2 only occurs on their peak surfaces as shown in Figs. 3-5.

In summary, Hirai et al. and Payne, alone or in combination, do not teach or suggest all of the claim limitations of independent claim 1. In addition, there is no teaching or suggestion in Hirai et al. or Payne to combine the teachings of the references as suggested by the Examiner. Further, there is no reasonable expectation of success with such a combination of Hirai et al. and Payne as suggested by the Examiner. Therefore, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness of claim 1 based upon the prior art as required by 35 U.S.C. §103.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the subject matter defined by independent claim 1. Accordingly, independent claim 1 is allowable. Dependent claims 2-6 and 17-18 depend from independent claim 1 and are allowable for the same and other reasons. In addition, the additional subject matter defined by

the dependent claims provides separate bases for allowance. For example, claims 2 and 4-6 provide a separate bases for allowance.

Claim 2 depends from independent claim 1 and recites that the disc ramp is angled approximately 10° relative to the disc face.

As discussed above and acknowledged by the Examiner, Hirai et al. does not teach or suggest the subject matter of claim 1, which includes the recitation of a disc ramp. Hirai et al. also does not teach or suggest a disc ramp angled approximately 10° relative to a disc face. Accordingly, for these and other reasons, Hirai et al. does not teach or suggest the additional subject matter defined by dependent claim 2.

The Examiner acknowledges that Payne is silent to the angle of the ramps (Office action dated 4/26/04, page 4, second full paragraph), but nevertheless contends that it would be obvious to one of ordinary skill in the art at the time of the invention to have provided the ramps of Payne with an angle of 10 degrees relative to the disc face merely because it would have been a design choice based on the materials used and the force desired to be absorbed by the ramps. Also, the Examiner contends that it would have been obvious to make the ramp angles 10 degrees since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art.

Payne does not cure the deficiencies of Hirai et al. As acknowledged by the Examiner, Payne does not teach or suggest a disc ramp angled approximately 10° relative to a disc face. Also, Applicant respectfully disagrees with the Examiner's contention that the angle of the disc ramp is obvious. Firstly, deficiencies of references cannot be saved by appeals to "common sense" and "basic knowledge" without any evidentiary support. In re Zurko, 258 F.3d 1379 (Fed. Cir. 2001). Applicant respectfully points out that the Examiner has shown no evidentiary support to show that the angle of the disc ramp was merely a design choice. Secondly, the approximate 10° angle of the disc ramp was selected for the purpose of allowing dynamic engagement of the plateaus at high speed without damage. If the angle is too shallow, the brake plate will creep under vibration up the disc ramps, therefore causing the braking system to fail in high vibration intended environments. If the angle is too steep, the plateaus of the brake plate will be damaged due to the high impact loading thereon originating from the high speed engagement with the disc plateaus. Therefore, the disc ramp angled approximately 10° relative to the disc face is not obvious because it must achieve the dual function of high-speed dynamic engagement without damage and holding under continuous high torque simultaneously with

applied vibration. Since the areas B1, B2 and D1, D2 of Payne do not interlock or mate with grooves W defined between the areas, the disclosure of Payne is unrelated to the claimed invention and a feature that is based on dynamic engagement would not be obvious from the disclosure of Payne. One can not merely say that a dynamic engagement feature is obvious in view of an unrelated art that actually teaches away from dynamic engagement.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 2. Accordingly, claim 2 is allowable.

Claim 4 depends from dependent claim 3, which depends from independent claim 1. Claim 4 recites that the disc ramp is angled approximately 10° relative to the disc face.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 4. Rather than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 4. Accordingly, claim 4 is allowable.

Claim 5 depends from dependent claim 4, which depends from dependent claim 3 and independent claim 1. Claim 5 recites that the plate ramp is angled approximately 10° relative to the plate face. The arguments made above with respect to claim 2 and the disc ramp angled approximately 10° relative to the disc face hold true for the plate ramp that is angled approximately 10° relative to the plate face. Rather than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 5. Accordingly, claim 5 is allowable.

Claim 6 depends from independent claim 1 and recites that the disc ramp is angled at an angle of between approximately 5° and 20°.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 6. The arguments set forth above with respect to claim 2 and the disc ramp being angled approximately 10° relative to the disc face also hold true for the disc ramp being angled at an angle between approximately 5° and 20°. A disc ramp having an angle between 5° and 20° may achieve the dual function of high speed dynamic engagement without damage and holding under continuous high torque simultaneously with applied vibration. Rather

than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 6. Accordingly, claim 6 is allowable.

Independent claim 7 cites (underlining added for emphasis):

A braking system for braking a rotatable shaft, the system comprising:
a brake plate moveable between an engaged position and a retracted position, the brake plate including a plate face having a plurality of plate plateaus positioned around the circumference of the brake plate, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled at an angle of between approximately 5° and 20°;

a coil that is powered to create a magnetic field to move the brake plate between its engaged and retracted positions;

a brake disc mounted to the shaft for rotation relative to the brake plate, the brake disc including a disc face positioned substantially parallel and adjacent to the plate face and including a plurality of disc plateaus, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau, the disc ramps being angled at an angle of between approximately 5° and 20° relative to the disc face, the disc plateaus defining recesses between consecutive disc plateaus that are dimensioned to correspond to the plate plateaus such that the plate plateaus mate with the recesses; and

a spring, the disc face and the plate face being biased against each other by the spring.

As discussed above, Applicant respectfully submits that there is no motivation to combine Hirai et al. and Payne as suggested by the Examiner and that there is no reasonable expectation of success for such a combination to achieve the claimed subject matter of claim 7. Rather than re-represent the arguments set forth above with regard to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 1.

In addition, assuming arguendo that the teachings of Hirai et al. could or should be combined, Applicant respectfully points out that, even with the modification suggested by the Examiner, the subject matter defined by independent claim 7 is not provided by the references. As acknowledged by the Examiner (Office action dated 4/26/04, page 3, paragraph 4) Hirai et al. does not teach or suggest a plate face having a plurality of plate plateaus positioned around the

circumference of the brake plate, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled at an angle of between approximately 5° and 20°, a plurality of disc plateaus, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau, the disc ramps being angled at an angle of between approximately 5° and 20° relative to the disc face, and the disc plateaus defining recesses between consecutive disc plateaus that are dimensioned to correspond to the plate plateaus such that the plate plateaus mate with the recesses.

Payne does not cure the deficiencies of Hirai et al. Payne also does not teach or suggest, among other things, a plate face having a plurality of plate plateaus positioned around the circumference of the brake plate, each plate plateau including a plate ramp extending between the plate face and a top surface of the plate plateau, the plate ramps being angled at an angle of between approximately 5° and 20°, a plurality of disc plateaus, each disc plateau including a disc ramp extending between the disc face and a top surface of the disc plateau, the disc ramps being angled at an angle of between approximately 5° and 20° relative to the disc face, and the disc plateaus defining recesses between consecutive disc plateaus that are dimensioned to correspond to the plate plateaus such that the plate plateaus mate with the recesses (underlining added for emphasis).

The Examiner contends that it would have been obvious to one having ordinary skill in the art at the time of the invention to have provided the contacting disc and plate surfaces of Hirai et al. with the plurality of plateaus and recesses as taught by Payne in order to positively lock the plate to the disc in order to prevent further relative motion.

In fact, Payne teaches away from the Examiner's contention and away from the claimed subject matter of independent claim 7. In particular, the rings E and F make it possible to place the grooves W and torque producing areas B1, B2, D1, D2 quite close together as shown in Figs. 3-5 without danger of interlocking (underlining added for emphasis) or of too great of wear on the engaging faces of the areas B1, B2, D1, D2 (page 2, column 1, lines 21-29). Accordingly, torque producing areas B1 and B2 do not mate with grooves W formed between torque producing areas D1 and D2, nor do the torque producing areas D1 and D2 mate with the grooves W formed between torque producing areas B1 and B2. Contact between the torque producing areas B1 and B2 and the torque producing areas D1 and D2 only occurs on their flat peak surfaces as shown in Figs. 3-5.

In summary, Hirai et al. and Payne, alone or in combination, do not teach or suggest all of the claim limitations of independent claim 7. In addition, there is no teaching or suggestion in Hirai et al. or Payne to combine the teachings of the references as suggested by the Examiner. Further, there is no reasonable expectation of success with such a combination of Hirai et al. and Payne as suggested by the Examiner. Therefore, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness of claim 7 based upon the prior art as required by 35 U.S.C. §103.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the subject matter defined by independent claim 7. Accordingly, independent claim 7 is allowable. Dependent claims 8-11, 13-14 and 19-20 depend from independent claim 7 and are allowable for the same and other reasons. In addition, the additional subject matter defined by the dependent claims provides separate bases for allowance. For example, claims 8, 11 and 14 provide a separate bases for allowance.

Claim 8 depends from independent claim 7 and recites that the number of plate plateaus is equal to the number of disc plateaus.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 8. As discussed above and acknowledged by the Examiner, Hirai et al. does not disclose plate plateaus and disc plateaus.

In addition, assuming arguendo that the plate plateaus and disc plateaus of the claims are the areas B1, B2 and D1, D2 of Payne, Payne does not disclose anywhere in the specification or does not illustrate anywhere in the drawings that the clutch mechanism includes the same number of areas B1, B2 as the number of areas D1, D2. The assumption made by the Examiner that Payne discloses the same number of areas B1, B2 as D1, D2 is based on nothing disclosed in the references and is based on common sense or basic knowledge. Deficiencies of references cannot be saved by appeals to “common sense” and “basic knowledge” without any evidentiary support. In re Zurko, 258 F.3d 1379 (Fed. Cir. 2001). There must be some disclosure or motivation within Payne to show that the clutch mechanism includes the same number of areas B1, B2 as areas D1, D2 and Payne does not do this. The prior art must provide a motivation or reason for the worker in the art, without the benefit of Applicant’s specification, to make the necessary changes in the reference device. Ex parte Chicago Rawhide Mfg. Co., 223 U.S.P.Q. 351, 353 (Bd. Pat. App. & Inter. 1984).

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 8. Accordingly, claim 8 is allowable.

Claim 11 depends from dependent claim 10, which depends from dependent claims 8 and 9 and ultimately from independent claim 7. Claim 11 recites that the disc ramp is angled approximately 10° relative to the disc face.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 11. Rather than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 11. Accordingly, claim 11 is allowable.

Claim 14 depends from independent claim 7 and recites that the plate ramps and the disc ramps are angled at approximately 10°.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 14. Rather than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 14. Accordingly, claim 14 is allowable.

Independent claim 15 recites:

A method of braking a rotating shaft, the method comprising:
attaching the shaft to a brake disc, the brake disc having a disc face with shallow disc plateaus protruding from it; and
providing a brake plate with a plate face and a spring force to selectively engage the plate face of the brake plate with the disc face of the brake disc, the plate face having shallow plate plateaus protruding from it, the spring force being chosen to permit the disc plateaus to slide over the plate plateaus in a dynamic braking portion of the method and prevent sliding of the disc plateaus over the plate plateaus in a locking portion of the method.

As discussed above, Applicant respectfully submits that there is no motivation to combine Hirai et al. and Payne as suggested by the Examiner and that there is no reasonable expectation of success for such a combination to achieve the claimed subject matter of claim 15.

Rather than re-represent the arguments set forth above with regard to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 1.

Further, assuming *arguendo* that the teachings of Hirai et al. could or should be combined, Applicant respectfully points out that, even with the modification suggested by the Examiner, the subject matter defined by independent claim 15 is not provided by the references.

As acknowledged by the Examiner (Office action dated 4/26/04, page 3, paragraph 4) Hirai et al. does not teach or suggest a disc face with shallow disc plateaus protruding from it and a plate face having shallow plate plateaus protruding from it, the spring force being chosen to permit the disc plateaus to slide over the plate plateaus in a dynamic braking portion of the method and prevent sliding of the disc plateaus over the plate plateaus in a locking portion of the method.

Payne does not cure the deficiencies of Hirai et al. Payne also does not teach or suggest, among other things, a disc face with shallow disc plateaus protruding from it and a plate face having shallow plate plateaus protruding from it, the spring force being chosen to permit the disc plateaus to slide over the plate plateaus in a dynamic braking portion of the method and prevent sliding of the disc plateaus over the plate plateaus in a locking portion of the method (underlining added for emphasis).

In fact, Payne teaches away from the Examiner's contention and away from the claimed subject matter of independent claim 15. In particular, the rings E and F make it possible to place the grooves and torque producing areas B1, B2, D1, D2 quite close together as shown in Figs. 3-5 without danger of interlocking or of too great of wear on the engaging faces of the areas B1, B2, D1, D2 (page 2, column 1, lines 21-29). Accordingly, the clutch system of Payne does not permit the torque producing areas D1 and D2 to slide over the torque producing areas B1 and B2 in a dynamic braking portion of the method and does not prevent sliding of the areas D1 and D2 over the areas B1 and B2 in a locking portion of the method, and vice versa. Also, there is no teaching or suggestion of dynamic braking in Payne.

In summary, Hirai et al. and Payne, alone or in combination, do not teach or suggest all of the claim limitations of independent claim 15. In addition, there is no teaching or suggestion in Hirai et al. or Payne to combine the teachings of the references as suggested by the Examiner. Further, there is no reasonable expectation of success with such a combination of Hirai et al. and Payne as suggested by the Examiner. Therefore, Applicant respectfully submits that the

Examiner has failed to establish a *prima facie* case of obviousness of claim 15 based upon the prior art as required by 35 U.S.C. §103.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the subject matter defined by independent claim 15. Accordingly, independent claim 15 is allowable. Dependent claims 16, 21 and 22 depend from independent claim 15 and are allowable for the same and other reasons. In addition, the additional subject matter defined by the dependent claims provides separate bases for allowance. For example, claim 22 provides a separate basis for allowance.

Claim 22 depends from independent claim 15 and recites that each disc plateau includes a disc ramp extending between the disc face and a top surface of the disc plateau, the plurality of plate plateaus correspond to the number of disc plateaus and each plate plateau includes a plate ramp extending between the plate face and a top surface of the plate plateau, and that the disc ramps are angled approximately 10° relative to the disc face and the plate ramps are angled approximately 10° relative to the plate face.

Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 22. Rather than re-present the arguments set forth above with respect to these contentions, for brevity's sake, Applicant refers to the relevant discussion above of claim 2.

For these and other reasons, Hirai et al. and Payne, alone or in combination, do not teach or suggest the additional subject matter defined by claim 22. Accordingly, claim 22 is allowable.

CONCLUSION

In view of the foregoing, entry of the present Amendment and allowance of claims 1-11 and 13-22 is respectfully requested.

The undersigned is available for telephone consultation during normal business hours.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul McGinley", with a long horizontal flourish extending to the right.

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